

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) An apparatus for engaging a work piece during an electrolytic process, the apparatus comprising:

a cup having an interior region and a lip within the interior region arranged such that the lip can support the work piece while the work piece remains within the interior region;

a first plurality of electrical contacts arranged about the lip for providing electrical current to the work piece via a metal layer thereon;

a second plurality of electrical contacts, which do not include electrical contacts from the first plurality of electrical contacts, arranged about the lip for measuring electrical resistance through the metal layer on the work piece; and

a cone having a work piece contact surface that fits within the cup's interior and can contact the work piece in a manner that holds the work piece in a fixed position between the work piece contact surface and the lip;

wherein a first circuit contains the first plurality of electrical contacts and a second circuit, isolated from the first circuit, contains the second plurality of electrical contacts.

2. (Original) The apparatus of claim 1, wherein each contact of the first plurality of electrical contacts comprises a resistor.

3. (Original) The apparatus of claim 2, wherein the resistor is a thick-film resistor.

4. (Original) The apparatus of claim 3, wherein the thick-film resistor is made of a material comprising at least one of ruthenium oxide, platinum-silver, and palladium-silver.

5. (Original) The apparatus of claim 1, wherein the work piece is a semiconductor wafer.

6. (Original) The apparatus of claim 5, wherein the lip comprises a lip seal made from a material that provides a fluid-tight seal with the semiconductor wafer when the wafer is held in place by the cone.
7. (Original) The apparatus of claim 6, wherein the material is an elastomer comprising at least one of a silicone rubber, a fluoropolymer, a butyl rubber.
8. (Canceled)
9. (Original) The apparatus of claim 7, wherein each of the first and second plurality of electrical contacts makes electrical connection to the metal layer via one or more embedded contacts in the elastomer.
10. (Currently Amended) The apparatus of claim 9, wherein the one or more embedded contacts comprise at least one of ~~Isecon~~, conductive polymers, wires, flat metal springs, ~~ShinEtsu~~ connectors, and z-conductive polymers.
11. (Original) The apparatus of claim 10, wherein the one or more embedded contacts comprise at least one of beryllium-copper, gold-palladium, beryllium-copper plated with gold-palladium, Paliney-7, platinum plated on stainless steel, rhodium plated on stainless steel, and rhodium.
12. (Original) The apparatus of claim 11, wherein the embedded contact comprises a wire.
13. (Original) The apparatus of claim 12, wherein the wire is between about .003 and .015 inches in diameter.
14. (Original) The apparatus of claim 1, wherein at least a portion of the cup comprises at least one of a plastic, a ceramic, a plastic-coated ceramic, a plastic-coated metal, a glass, a glass-coated metal, a glass-coated ceramic, a silicon-oxide coated ceramic, and a composite.
15. (Original) The apparatus of claim 14, wherein a plastic used in the coating of the plastic-coated ceramic or metal is a fluoropolymer.

16. (Original) The apparatus of claim 14, wherein the ceramic or a ceramic used in the plastic-coated ceramic is alumina or zirconia.
17. (Original) The apparatus of claim 9, wherein the width of the lip seal is between about 1 and 4mm wide.
18. (Original) The apparatus of claim 17, wherein the width of the lip seal is about 1mm wide.
19. (Original) The apparatus of claim 18, wherein lip seal contacts the metal layer on the wafer's outermost circumferential edge.
20. (Original) The apparatus of claim 5, wherein the metal layer is a copper seed layer.
21. (Original) The apparatus of claim 2, wherein the resistor has an electrical resistance of between about 1 and 20ohms.
22. (Original) The apparatus of claim 2, wherein the resistor has an electrical resistance of about 6ohm.
23. (Original) The apparatus of claim 1, wherein the first plurality of electrical contacts comprises between about 100 and 1000 electrical contacts.
24. (Original) The apparatus of claim 23, wherein the first plurality of electrical contacts comprises at least 128 electrical contacts for a 200mm wafer.
25. (Original) The apparatus of claim 23, wherein the first plurality of electrical contacts comprises at least 384 electrical contacts for a 300mm wafer.
26. (Original) The apparatus of claim 1, wherein the second plurality of electrical contacts comprises between about 2 and 16 electrical contacts.
27. (Original) The apparatus of claim 1, wherein the second plurality of electrical contacts comprises 4 electrical contacts.

28. (Original) The apparatus of claim 1, wherein each contact of the first plurality of electrical contacts has its own individually regulated current source.

29. (Original) The apparatus of claim 21, wherein the resistor is between about 2 and 50mm from the point where its associated electrical contact meets the metal layer.

30. (Original) The apparatus of claim 29, wherein the resistor is about 5mm from the point where its associated electrical contact meets the metal layer.

31-62. (Canceled)